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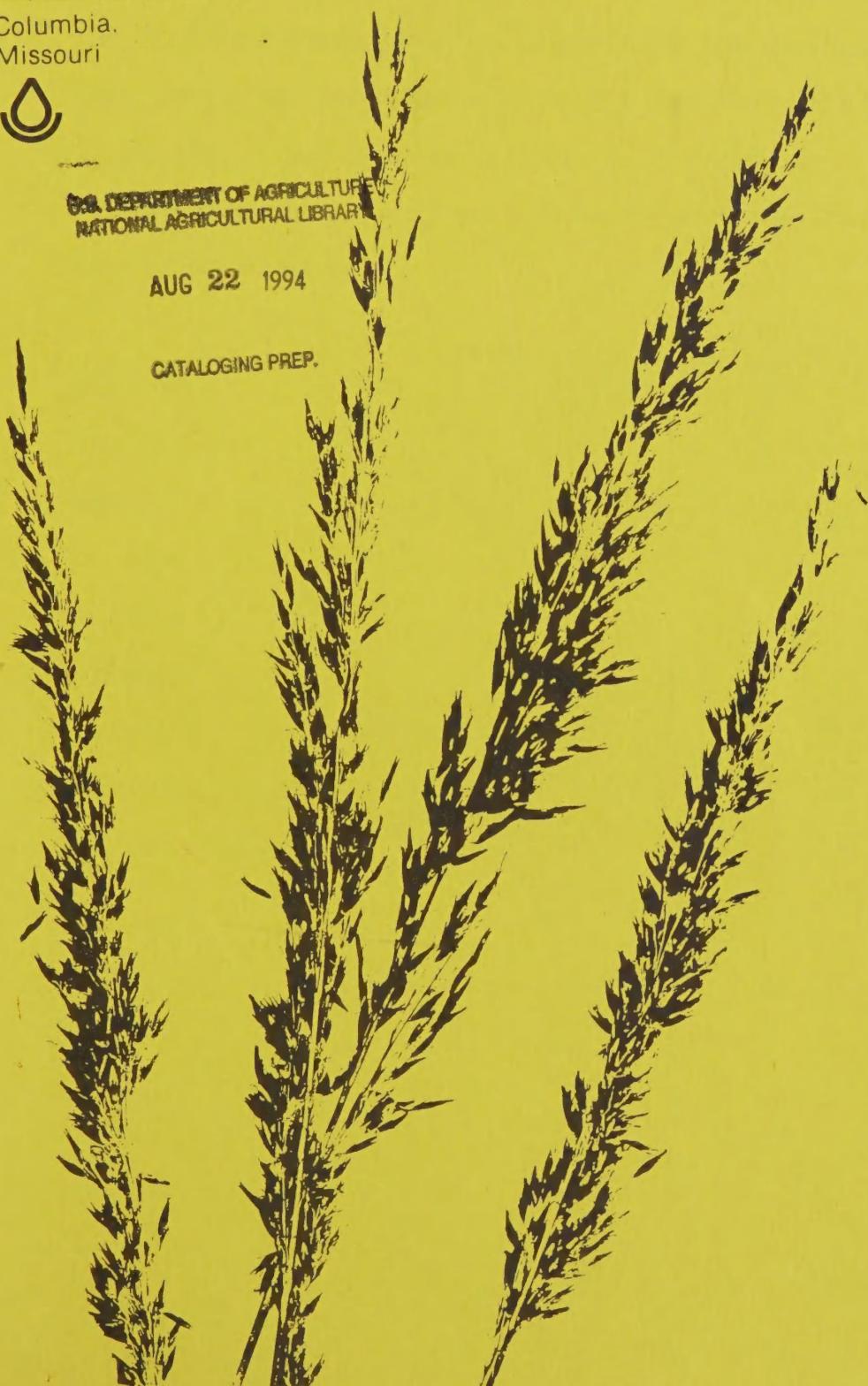
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Top Of The Ozarks

A Pasture Management Guide for the Ozarks



Resource
Conservation
and Development
Project
Houston, Mo.

United States
Department of
Agriculture



INTRODUCTION

The Ozark Pasture Management Guide has been prepared for guidance in establishing and maintaining pasture and hay crops in the South Central Missouri Ozarks area, especially in the counties comprising the Top of the Ozarks Resource Conservation and Development Project Area. While the information concerning the plants may be generally applicable, it was designed to apply to the cited local area. Difference in weather and soils would make its application questionable in another part of the country.

The organization of information involves a single sheet for each plant included. The two major divisions of the document are Grasses and Legumes with the grass division subdivided into Cool Season and Warm Season types of plants.

The Ozark Pasture Management Guide is an open ended and developing document. It will be revised in future years, as new varieties of plants are perfected and as new agricultural developments take place. Persons wanting to present ideas for inclusion in future issues should transmit their thoughts to the RC&D Coordinator, Soil Conservation Service, at Houston, Missouri.

ACKNOWLEDGEMENT

The material in this Pasture Management Guide was prepared under the guidance of Mr. Robert Agee of Texas County, who served as Chairman of the Resource Conservation and Development Agronomy Committee. Mr. Agee and Douglas S. Switzner, RC&D Coordinator, supervised the job of collecting, organizing, and reviewing material from the various sources.

Appreciation is extended to Federal and State agriculture people that have provided assistance, and to the many area farmers that have contributed from their forage production experiences to this publication.

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BROMEGRASS - *Bromus inermis*

- A. GENERAL PLANT DESCRIPTION: Brome is a long-lived perennial, sod-forming, cool season grass. It spreads underground by short rhizomes and is readily propagated by seed. It grows to a height of 3 to 4 feet.
- B. VARIETIES: Southland - Saratoga - Achenbach - Lincoln
- C. SITE: Best adapted to fertile, well drained silt loam or clay loam soil.
- D. ESTABLISHMENT:
 1. Seeding date: Spring - March 1 to April 15
Fall - August 20 to September 30
 2. Seeding rate: 12 pounds Pure Live Seed per acre
(12 kg/PLS/ha)

10 pounds Pure Live Seed per acre in mixtures
 3. Seeding depth: 1/4 to 1/2 inch
 4. Inoculant: None
 5. Soil fertility: Fertilize and lime according to soil test.
 6. Seedbed preparation: A moist, firm, fertile seedbed is required.
 7. Method of seeding: Brome may be either drilled or broadcast. Drilling is much preferred for control of seeding rate and uniform shallow depth of planting. It is essential to cover the seed.

Bromegrass - 2

E. MANAGEMENT: Brome requires careful management. If grazed when stems are jointing, it will stop growth until growth buds develop from the crown or rhizomes. Jointing usually occurs between May 10 and June 10.

Turn in height 8 inches and graze down to no lower than 4 inches average height.

For hay, cut after full head emergence for first cutting, and after sprouts appear for succeeding cutting.

If production drops off due to "sod bound", use a chisel plow to renovate the pasture.

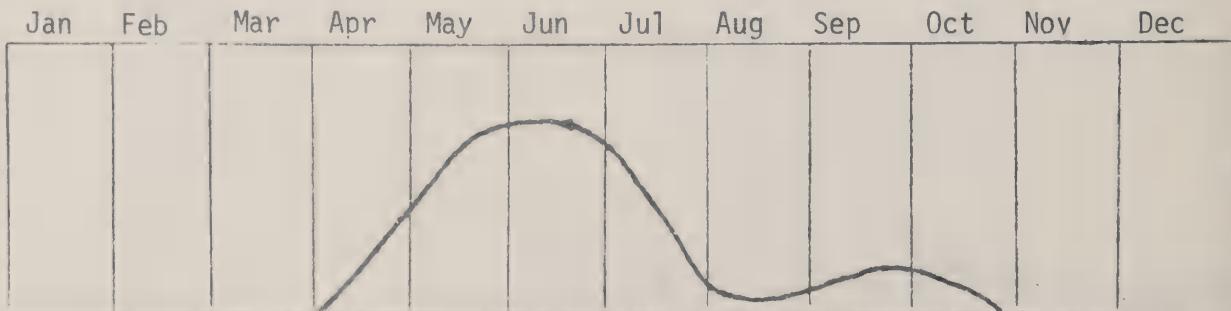
F. SEED PRODUCTION: Problem of seed harvest and cleaning is the light chaffy seed.

G. STRONG POINTS: Brome is very winter hardy and very palatable forage. Excellent for hay production.

H. WEAK POINTS: Requires heavy application of nitrogen for good production.

Makes 90 percent of total production in a 70 day period.

AVERAGE GROWTH CURVE



FESCUE - Festua arundinacea

- A. GENERAL PLANT DESCRIPTION: Fescue is a cool season, aggressive perennial bunch grass which grows to a height of 3 to 3-1/2 feet. It has a branched, open seedhead 4-12 inches long on a stiff flowering stem.
- B. VARIETIES: Kentucky - Alta - Kenmont - Fawn - Mo. 96
- C. SITE: Adapted to a wide variety of soils from poorly drained to droughty. Especially adapted to the adverse conditions in Southern Missouri.
- D. ESTABLISHMENT:
 - 1. Seeding date: Fall - August 15 to September 30
Winter and Spring - December 15 to April 15
 - 2. Seeding rate: 10-20 pounds Pure Live Seed per acre
(15 kg/PLS/ha)
 - 3. Seeding depth: 1/8 to 1/2 inch
 - 4. Inoculant: None
 - 5. Soil fertility: Use soil test. In absence of soil test a starter fertilizer of 20-60-30 may be used.
 - 6. Seedbed preparation: Wide range of conventional methods may be used. Fescue does not require a well prepared seedbed.
 - 7. Method of seeding: From truck mixed with fertilizer
 - Cyclone seeder
 - Drill
 - Aerial

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Fescue - 2

E. MANAGEMENT: Start grazing when grass is about 8 inches high.

Rotate grazing and construct pasture size so the entire field is grazed down to 3 - 4 inches in 2 weeks time.

Rest through July and August, if possible.

Control weeds and brush by mowing or herbicide.

Annually top dress with 60-40-40 in pure stand of fescue.

Lime every 4 to 5 years.

Fields to be used for fall and winter pasture should be top dressed with 40 - 60 pounds of nitrogen by August 15. Grazing fields in August reduces fall growth.

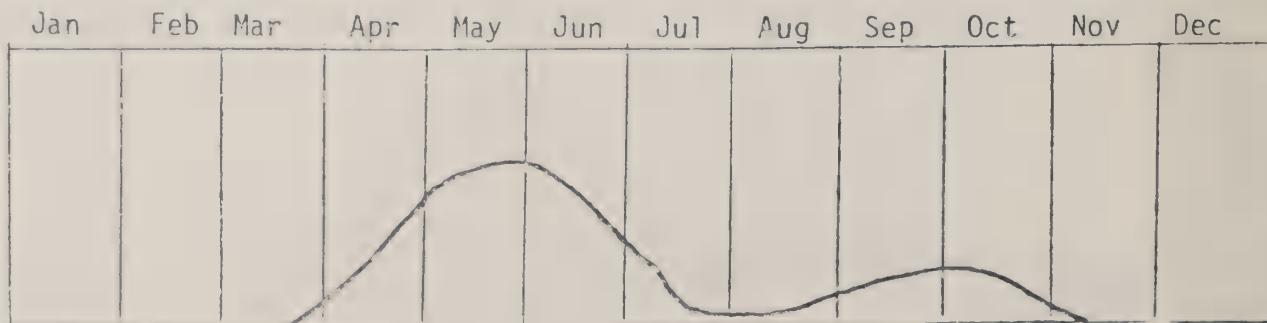
F. SEED PRODUCTION: Fescue seed can be harvested with a combine directly from standing plant. Producing fescue seed involves special fertility and management practice. Check with agency people for recommendations.

G. STRONG POINTS: Well adapted to shallow, droughty soils.

Shade tolerant and very hardy.

Excellent grass to stock pile for winter pasture
Easily established.

AVERAGE GROWTH CURVE



KENTUCKY BLUEGRASS - Poa Pratensis

- A. GENERAL PLANT DESCRIPTION: Kentucky bluegrass is a long-lived, sod-forming, cool season perennial grass. It reproduces by seed and spreads by underground stems. It grows to a height of 12 to 23 inches.
- B. VARIETIES: No field varieties.
- C. SITE: Adapted to well drained loams and heavier types of soils of medium and better productivity.
- D. ESTABLISHMENT:
 - 1. Seeding date: Spring - March 15 to April 15
Fall - August 15 to September 15
 - 2. Seeding rate: 15-20 pounds Pure Live Seed (16 kg/PLS/ha)
Usually sown in mixtures with other grasses and legumes at 1 to 4 pounds per acre.
 - 3. Seeding depth: 1/4 to 1/2 inch.
 - 4. Inoculant: None
 - 5. Soil fertility: Lime and fertilize according to soil test.
 - 6. Seedbed preparation: Work up seedbed to a minimum depth of 3 inches. It should be reasonably smooth and friable.
A firm seedbed is essential.
 - 7. Method of seeding: Broadcasting is the most common method used. Cultipacker seeders are very desirable for seeding bluegrass.

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Kentucky Bluegrass - 2

E. MANAGEMENT: Delay or defer grazing in the spring until vegetative growth is at least 4 inches and do not graze any closer than 2 inches.

Pastures should be rotation grazed and given rest periods.

Clip pastures if they have been grazed unevenly and to control weeds and brush.

Legumes are often established in existing bluegrass fields to improve production.

Pure blue grass sods should be fertilized annually with at least a 60-20-20 fertilizer.

F. SEED PRODUCTION: Yield 5 - 8 bushels per acre.

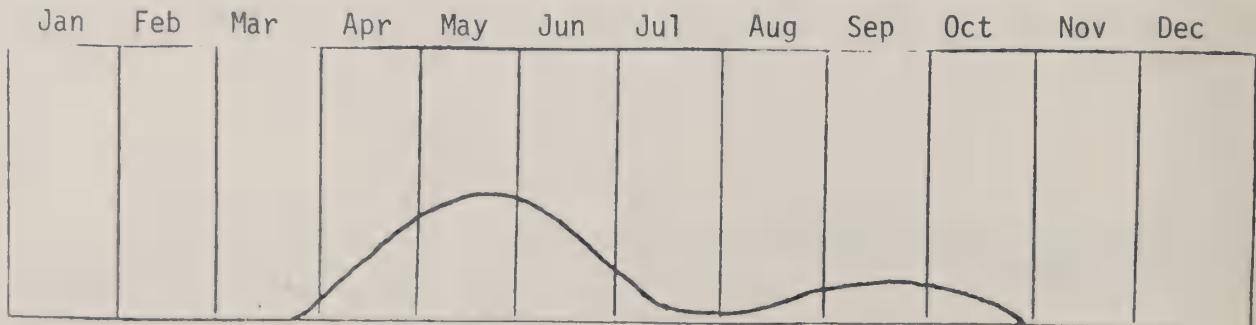
Seed production is hindered in many areas by "silver top" disease.

G. STRONG POINTS: At comparable stages of growth bluegrass contains more energy per pound of dry matter than smooth bromegrass.

Extremely palatable during periods of rapid growth.

H. WEAK POINTS: Relatively unproductive in mid-summer. Serious injury to plant population will occur if subjected continuously to soil and air temperatures of 100° F and above.

AVERAGE GROWTH CURVE



ORCHARDGRASS - Dactylis glomerata

- A. GENERAL PLANT DESCRIPTION: Orchardgrass is a cool-season perennial bunchgrass that grows from 2 to 4 feet tall.
- B. VARIETIES: Hallmark - Boone - Potomac - Sterling
- C. SITE: Suited to a variety of soils of medium to good fertility.
- D. ESTABLISHMENT:
 - 1. Seeding date: Spring - March 15 to April 15
Fall - August 15 to September 15
 - 2. Seeding rate: 12 pounds Pure Live Seed per acre
(12 kg/PLS/ha)
 - 3. Seeding depth: 1/8 to 1/2 inch
 - 4. Inoculant: None
 - 5. Soil fertility: Use soil test, however, in absence of soil test, use 20-60-30 fertilizer for basic treatment.
 - 6. Seedbed preparation: The seedbed should be loose on top and firm underneath. Press wheels or a cultipacker help to ensure stand establishment and survival.
 - 7. Method of seeding: Conventional grain drill or with specialized type of cultipacker seeder.

Broadcasting of seed is the least desirable method.

Band seed with grain drill with small grain.

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Orchardgrass - 2

E. MANAGEMENT:

Start to graze when 6 to 8 inches tall.
Graze no shorter than 4 inch average height. Develop pasture size so an entire field is grazed down in 2 weeks. Let rest 4 weeks. Graze off fall growth by end of October.

Annually top dress with fertilizer in February or March.

Lime on a regular basis using dolomite limestone.

Cut orchardgrass in late boot or early head stage for best quality hay.

Control weeds by mowing or use of approved chemicals.

F. SEED PRODUCTION:

Orchardgrass seed can be combined directly from the standing plant.

G. STRONG POINTS:

Shade tolerant.

Excellent for hay.

Orchardgrass does good in combination with legumes for pasture.

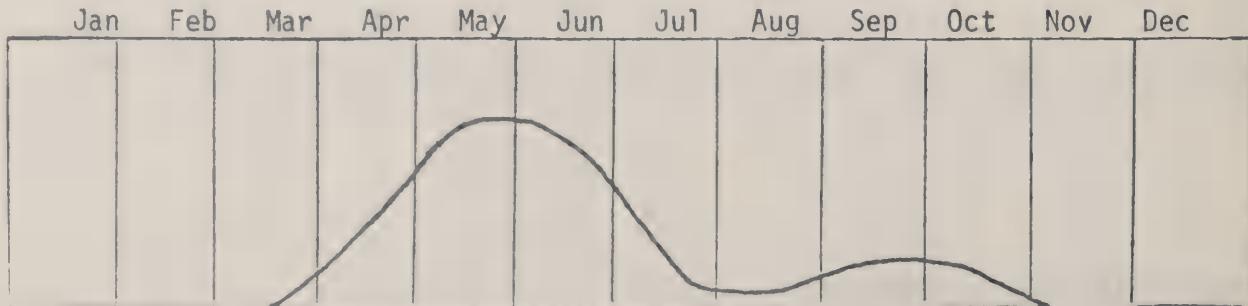
Orchardgrass is very palatable.

H. WEAK POINTS:

Orchardgrass will stand less dry weather than fescue.

Orchardgrass is not desirable to stockpile for winter pasture.

AVERAGE GROWTH CURVE



REDTOP - Agrostis alba

- A. GENERAL PLANT DESCRIPTION: Redtop is a sod-forming perennial grass which grows to a height of 3 feet. Its root system is made up of shallow, vigorous rootstalks 2 - 6 inches long, that form a loose, coarse turf. It has a creeping habit which enables an isolated plant to spread to a diameter of 3 feet.
- B. VARIETIES: None
- C. SITE: Adapted to a wide range of soil conditions. It will produce on acid and low fertility soils. This grass loves a wet soil.
- D. ESTABLISHMENT:
 - 1. Seeding date: August 15 to September 20
 - 2. Seeding rate: 4-6 pounds Pure Live Seed per acre
(5 kg/PLS/ha)
 - 3. Seeding depth: 1/4 inch or less
 - 4. Inoculant: None
 - 5. Soil fertility: Fertilize and lime according to soil test.
 - 6. Seedbed preparation: The seedbed shall be worked to a minimum depth of 3 inches with a plow, disk, or chisel type implement. A firm seedbed is important, if possible roll before and after seeding.
 - 7. Method of seeding: Broadcast seeding with a cyclone or endgate type seeder is commonly used.

Redtop - 2

E. MANAGEMENT: Generally grown in mixtures with other grasses and legumes.

Redtop responds to nitrogen fertilizers.

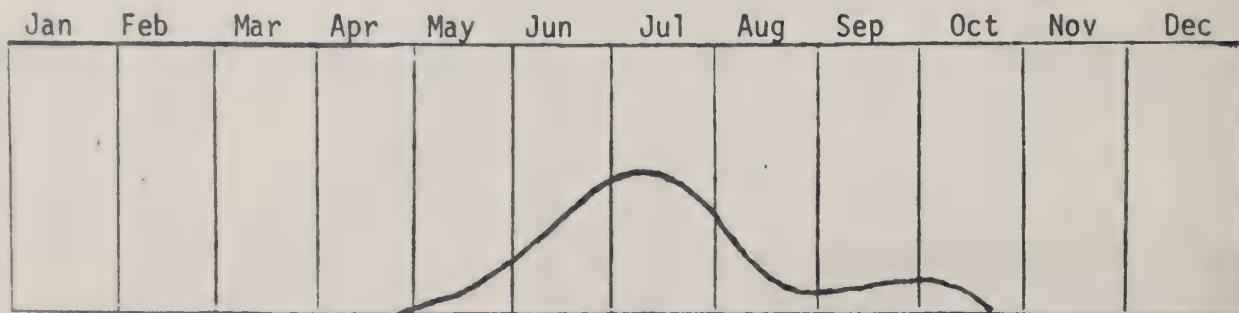
F. SEED PRODUCTION: Seed shatters readily during harvest.

Very small seed.

G. STRONG POINTS: Grows quickly and vigorously and helps to form a turf that protects the soil.

H. WEAK POINTS: Low forage yields and very little fall regrowth.

AVERAGE GROWTH CURVE



REED CANARYGRASS - Phalaris arundinacea

- A. GENERAL PLANT DESCRIPTION: Reed Canarygrass is a coarse sod-forming, cool season grass which grows 2 to 8 feet in height. It reproduces by seed and spreads vegetatively by stout creeping rootstocks.
- B. VARIETIES: Rise - Vantage - Ioreed
- C. SITE: Adapted to poorly drained and wet soils, and upland soils with fair to good water holding capacity.
- D. ESTABLISHMENT:
 1. Seeding date: Spring - March 1 to April 10
Fall - August 15 to September 15
 2. Seeding rate: 8-10 pounds Pure Live Seed per acre
(9 kg/PLS/ha)
 3. Seeding depth: 1/8 to 1/4 inch
 4. Inoculant: None
 5. Soil fertility: Reed Canarygrass is not adapted to saline soils but tolerates a pH range of 5.0 to 8.0. Soil test should be taken to determine plant food requirements.
 6. Seedbed preparation: A firm well prepared seedbed is very desirable.
 7. Method of seeding: Using conventional drill.

Can be established vegetatively with fresh cut well jointed stems covered with 2 - 3 inches of moist soil.

Reed Canarygrass - 2

E. MANAGEMENT: Graze when it is 12 to 20 inches in height.

Rotational grazing, with heavy pressure for short periods, provides the best utilization.

Mowing in summer to 3 - 4 inches will give more uniform grazing.

Split applications of nitrogen during the growing season result in more uniform production and lengthens the productive period.

Alsike clover mixed with Reed Canarygrass is a good companion legume.

F. SEED PRODUCTION: Reed Canarygrass may be grown in rows for maximum seed production. Wide spacing promotes tillering and allows cultivation for weed control. However, much commercial seed is harvested from solid stands.

G. STRONG POINTS: Very tolerant to long periods of flooding.

Highest yielding perennial grasses used for grazing on wet soils.

Makes a palatable and nutritious silage.

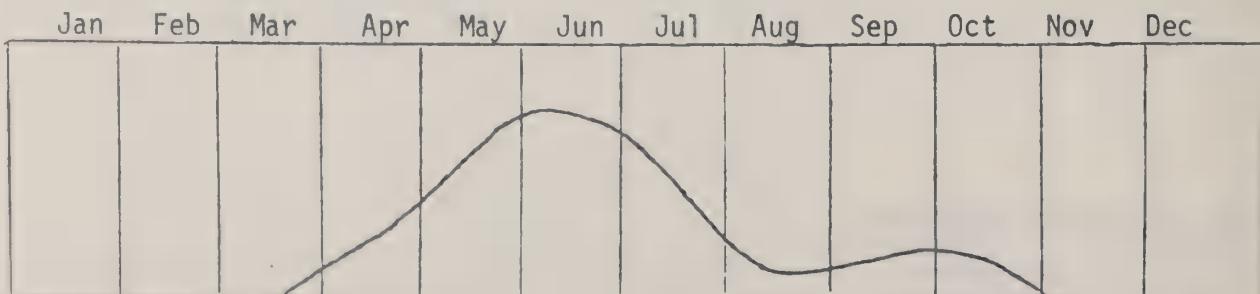
Starts growth early in spring.

Good for gully control and waterways in wet areas.

H. WEAK POINTS: Low seed germination makes it difficult to establish a good stand. Use fresh seed less than 18 months old.

Low palatability in late fall.

AVERAGE GROWTH CURVE



TIMOTHY - Phleum pratense

- A. GENERAL PLANT DESCRIPTION: Timothy is a cool-season, short-lived bunch grass that reproduces by seed. The smooth stems grow 2 to 3 feet tall. The stems are stiffly erect and emerge from a bulbous base to form large clumps. The root system is relatively shallow and fibrous.
- B. VARIETIES: Clair - Climax - Verdant
- C. SITE: Adapted to fertile, heavy soils, with good moisture holding ability.
- D. ESTABLISHMENT:
 - 1. Seeding date: August 15 - October 1
 - 2. Seeding rate: 6-10 pounds Pure Live Seed per acre
(8kg/PLS/ha)
2 pounds Pure Live Seed per acre in mixtures
 - 3. Seeding depth: 1/4 to 1/2 inch
 - 4. Inoculant: None
 - 5. Soil fertility: Use soil test
 - 6. Seedbed preparation: A firm well prepared seedbed is desirable.
 - 7. Method of seeding: Using conventional seed drill.

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E. MANAGEMENT: It is generally grown in mixtures with other grasses and legumes.

Timothy gives excellent response to nitrogen and phosphate fertilizers.

Cut for hay June 20 or early bloom.

F. SEED PRODUCTION: Timothy usually produces good yields of seed. Yields average 200 to 300 pounds per acre.

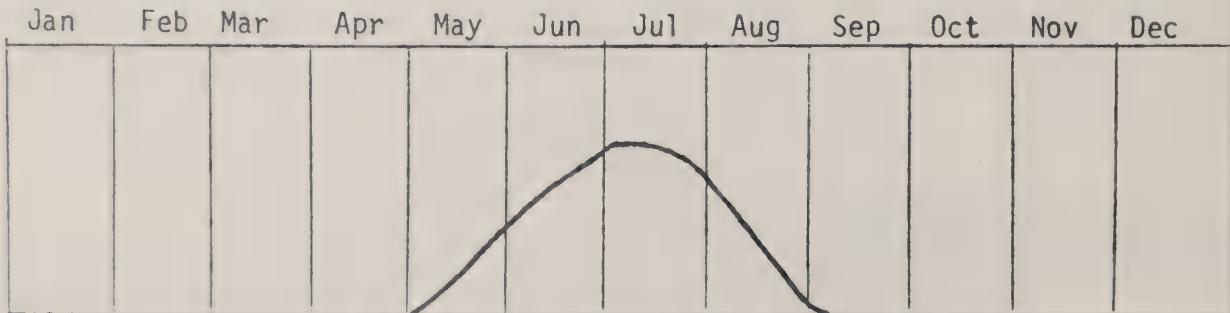
G. STRONG POINTS: Does not reach its growth as early in the season as most other cool-season grasses.

Very cold tolerant.

H. WEAK POINTS: Timothy is short lived and small amount of fall regrowth (20% maximum).

Timothy is not considered drought resistant.

AVERAGE GROWTH CURVE



BERMUDAGRASS - Cynodon dactylon

- A. GENERAL PLANT DESCRIPTION: Bermudagrass is a warm season, creeping perennial, sod-forming grass which propagates by seed, runners and underground rootstocks.
- B. VARIETIES: Midland - Hardy - Greenfield - Common
- C. SITE: Adapted to moderately well-drained bottom soils, acid or alkaline soil.
- D. ESTABLISHMENT:
 - 1. Seeding date: Sprigged - March 1 - June 1.
 - 2. Seeding rate: 10-20 bushels of sprigs per acre.
 - 3. Seeding depth: Roots should be placed in firm moist soil and covered no more than 1 to 2 inches.
 - 4. Inoculant: None
 - 5. Soil fertility: Does best at 5.5 pH or above. Apply 0-40-60 before sprigging if soil test is absent. Apply 40-50 pounds of actual nitrogen per acre after runners have reached an 8 inch length.
 - 6. Seedbed preparation: Well prepared clean, firm seedbed, or sprigged in a small grain stubble will control weed competition.
 - 7. Method of seeding: Sprig in 20-40 inch rows with commercial sprigger. Compaction of soil around sprigs is vital. Run tractor wheel or sprigger wheel over newly planted sprigs. Scatter sprigs with a manure spreader then disk lightly and roll.

Bermudagrass - 2

E. MANAGEMENT: New plantings should not be grazed until runners have lapped the sprigged rows.

An approved herbicide may be needed to control weeds the first growing season.

Graze when grass reaches 6 - 8 inches in height.

Grass can be grazed to 3 - 4 inch stubble.

Fertilize about May 15.

Do not fertilize after August 15 or it will cause excessive winter kill.

Sod-bound bermuda loses vigor. If this occurs, disk or tear up sod with a tiller and fertilize.

F. SEED PRODUCTION: Sprigs dug with a tiller should be kept moist and cool. Heating sprigs will cause severe damage, and poor viability.

G. STRONG POINTS: Thrives in warm or hot weather.

Withstands closer grazing than native bluestems.

Hay quality is good and haying period is excellent.

H. WEAK POINTS: Does not tolerate shade.

Lacks winter hardiness.

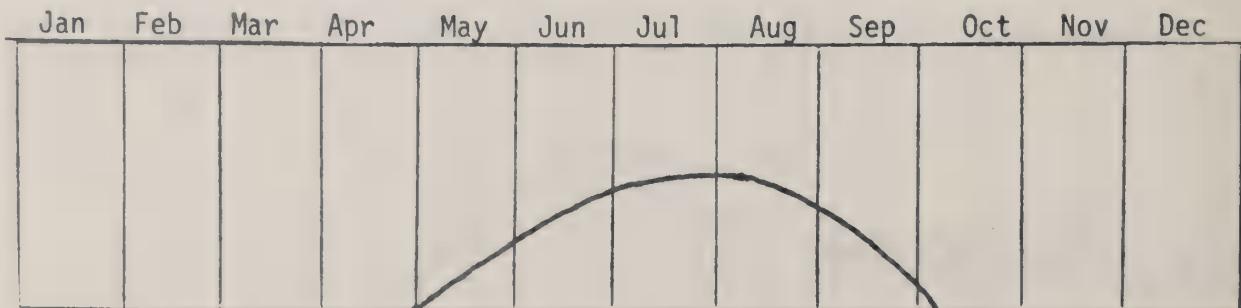
Seeding not recommended.

Difficult to control in row or cultivated crops.

Establishment is slow if competition is not controlled.

Does not do well on upland clay soils.

AVERAGE GROWTH CURVE



BIG BLUESTEM - *Andropogon gerardi*

- A. GENERAL PLANT DESCRIPTION: Big bluestem is a native, warm-season, perennial which grows 4 - 6 feet in height, has short scaly underground stems and roots that saturate the top two feet of soil and may reach depths up to twelve feet.
- B. VARIETIES: Kaw
- C. SITE: Best adapted to deep, fertile soils, but grows abundantly during wet periods on shallow, gravelly ridges.
- D. ESTABLISHMENT:
 1. Seeding date: April 15 - June 1.
 2. Seeding rate: 8-10 pounds Pure Live Seed per acre.
(9 kg/PLS/ha)
 3. Seeding depth: 1/8 to 1/4 inch.
 4. Inoculant: None.
 5. Soil fertility: Use soil test to determine plant food needs. Use ■ 0-60-60 starter fertilizer. No nitrogen on new seedlings or the weeds will get it all!
 6. Seedbed preparation: Hard, well-prepared, weed free seedbed is very necessary.
 7. Method of seeding: Specialized seeder that has depth bands and packer wheels is preferred. Seeding may be done by mixing seed with fertilizer and applying with a fertilizer spreader, however, caution should be taken to keep the seed from separating from the fertilizer. Roll with cultipacker before and after seeding.

Big Bluestem - 2

E. MANAGEMENT: Do not graze the year of establishment.

Chemical control for weeds may be necessary during the first growing season.

Defer grazing the second year until the plants reach a height of 20 - 24 inches. Do not graze down any lower than 10 inch average height.

Top dress annually with 50 pounds of nitrogen and 30 pounds of phosphate fertilizer applied in late May or early June.

To improve stand vigor rest until August 1.

Graze between June 10 and September 10.

Defer grazing every 2 - 3 years for 2 - 4 months.

Control burn at start of growth every third year when spring growth is 1/2 to 1 inch high.

Nitrogen fertilizer, without control burning, will stimulate growth of cool season grasses and will crowd out the bluestem.

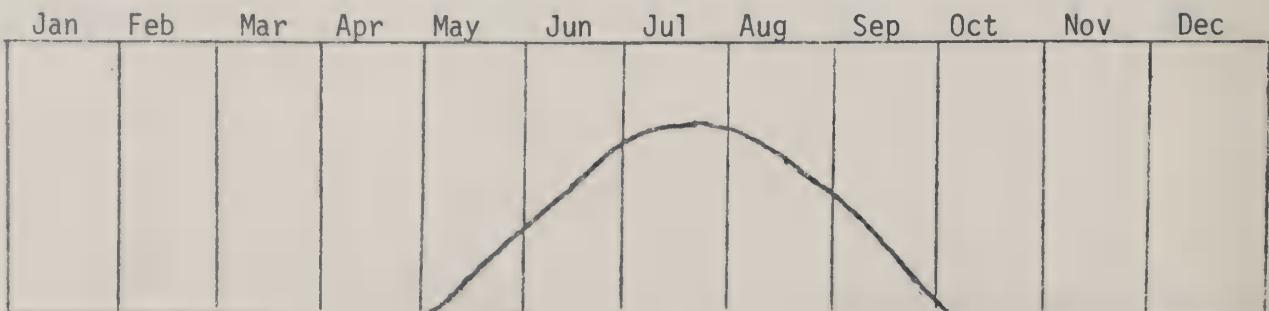
Cut for hay in early boot stage.

F. SEED PRODUCTION: Plant in rows for seed production. Harvesting of seed is much more difficult than cool season grasses.

G. STRONG POINTS: Desirable for wildlife nesting and habitat.

H. WEAK POINTS: Usually takes 3 years to reach full production.

AVERAGE GROWTH CURVE



CAUCASIAN BLUESTEM - *Andropogon caucasicus*

- A. GENERAL PLANT DESCRIPTION: Caucasian bluestem is an introduced warm-season, perennial bunchgrass from Russia. It grows to a height of 3 - 4 feet.
- B. VARIETIES: None.
- C. SITE: Best adapted to a loamy, well drained site. However, it will make good production on shallow, droughty soils.
- D. ESTABLISHMENT:
 1. Seeding date: April 20 - June 1.
 2. Seeding rate: 2 pounds Pure Live Seed per acre
(2 kg/PLS/ha)
 3. Seeding depth: 1/8 inch or less.
 4. Inoculant: None.
 5. Soil fertility: Soil test should be used to determine plant food needs.
 6. Seedbed preparation: Well prepared, very firm, weed-free seedbed is very necessary. Use no nitrogen in starter fertilizer.
 7. Method of seeding: Specialized grassland seeder with depth bands and packer wheels. Mixing caucasian seed with fertilizer and using fertilizer box on grain drill with spring tension removed and letting drag chains cover has been used. Rolling after seeding is very desirable.

Caucasian Bluestem - 2

E. MANAGEMENT: Do not graze the first year. Let seed mature for harvest or fall out to thicken stand.

Chemical control of weeds may be necessary the first year. Follow label directions of herbicide very carefully.

Graze when grass is 12 - 18 inches high.

Do not graze closer than 4 inches.

Annual top dress about middle of May with a 60-40-40 fertilizer.

A split application of fertilizer will benefit total production. Apply second application about August 1.

F. SEED PRODUCTION: Has the ability to produce two seed crops a year. The first two years after establishment produces the best seed crops. Harvesting of seed is difficult because the seed matures throughout the growing season.

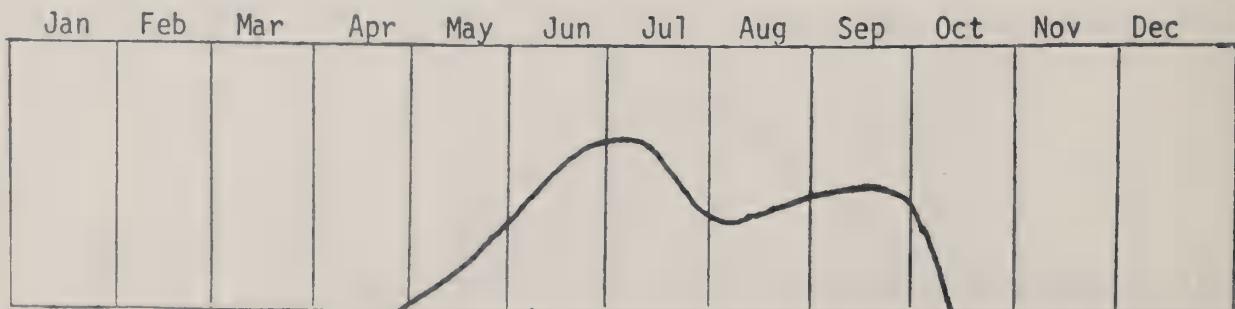
G. STRONG POINTS: Makes excellent growth in July and August, if sufficient moisture is available. Will stand closer grazing than native warm-season grasses.

H. WEAK POINTS: Difficulty has been experienced in establishing a good stand.

Weed competition during year of establishment.

Not shade tolerant.

AVERAGE GROWTH CURVE



INDIANGRASS - Sorghastum nutans

- A. GENERAL PLANT DESCRIPTION: Indiangrass is a native, perennial, warm-season tall grass which produces from seed and short, scaly underground stems. The plume-like seed heads are on stems from 4 to 8 feet tall.
- B. VARIETIES: Osage
- C. SITE: Best adapted to moist, well drained soil from heavy clays to deep sands. It will produce good growth on droughty infertile soil.
- D. ESTABLISHMENT:
 - 1. Seeding date: April 15 - June 1.
 - 2. Seeding rate: 6.5 pounds Pure Live Seed per acre
(6 kg/PLS/ha)
 - 3. Seeding depth: 1/8 to 1/4 inch.
 - 4. Inoculant: None.
 - 5. Soil fertility: Use soil test to determine plant food needed.
 - 6. Seedbed preparation: Well prepared, clean and very firm seedbed.
 - 7. Method of seeding: The best method is to use a specialized seeder. Mixing the seed with fertilizer and using fertilizer spreader, or using the fertilizer box on a grain drill has been used. Watch for separation of seed and carrier, such as fertilizer. Rolling before and after seeding is very desirable.

Indiangrass -2

E. MANAGEMENT: Do not graze the year of establishment.

Chemical control for weeds may be necessary during the first growing season.

Graze between June 1 - September 15.

Graze when grass is 16 - 20 inches tall. When eaten down to 8 inches, move animals to another pasture.

The grass responds to nitrogen fertilizer with increased forage and seed production. If fertilizer is used, apply after growing starts (approximately May 10).

Defer grazing 90 - 100 days during growing season every 2 - 3 years.

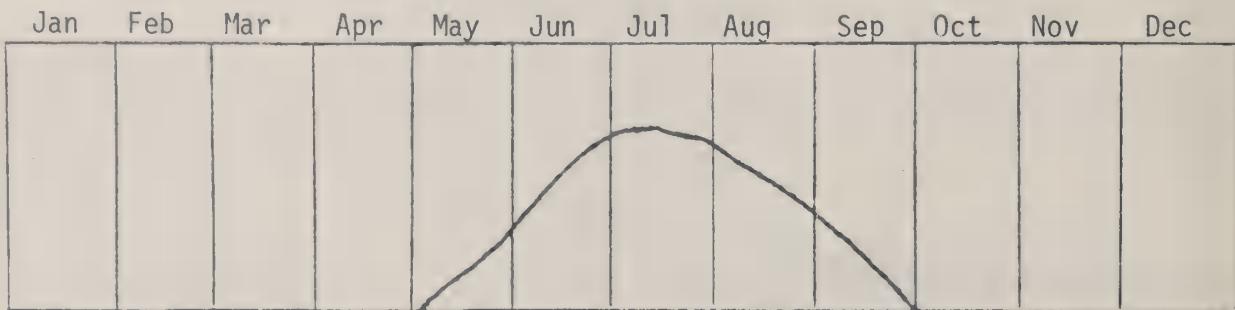
Controlled burning is necessary and should be done when spring growth is 1/2 to 1 inch high.

F. SEED PRODUCTION: Indiangrass seed can be harvested with a combine or by hand stripping.

G. STRONG POINTS: Very nutritious and readily eaten by all classes of livestock.

H. WEAK POINTS: Grazing shorter than 8 inches will decrease stand.

AVERAGE GROWTH CURVE



LITTLE BLUESTEM - Andropogon scoparius

- A. GENERAL PLANT DESCRIPTION: Little bluestem is a native, warm season, perennial mid grass (2-4 feet tall) with a dense root system that may reach a depth of 5 to 8 feet. This bunch grass spreads by seed, tillers and short underground rootstocks.
- B. VARIETIES: Aldous
- C. SITE: Little bluestem grows on a wide variety of soils but does best on calcareous soils derived from limestone. Can be grown on shallow, gravelly, droughty soils.
- D. ESTABLISHMENT:
 - 1. Seeding date: April 15 - June 1
 - 2. Seeding rate: 4.3 - 5 pounds Pure Live Seed per acre (4.5 kg/PLS/ha) will give 20 Pure Live Seed per square foot.
 - 3. Seeding depth: 1/8 - 1/4 inch.
 - 4. Inoculant: None.
 - 5. Soil fertility: Only use a 0-60-60 starter fertilizer.
 - 6. Seedbed preparation: A firm, clean, well-prepared seedbed is necessary. Seedbed should be rolled or cultipacked before and after seeding.
 - 7. Method of Seeding: Specialized seeder, fertilizer spreader, (caution on separation of seed and carrier) or fertilizer compartment on a grain drill, with tension removed, and rolled to make very firm.

Little Bluestem - 2

E. MANAGEMENT: Do not graze during year of establishment.

Chemical weed control may be necessary during the first or second growing season. Caution: Follow directions on container label.

Graze when grass is 12 - 18 inches high. Remove cattle when the grass has been grazed down to 6 - 8 inches in height.

Grazing should be deferred for 90 days every 2 - 3 years.

A control burn may be needed to remove plant residue buildup in 3 - 5 years. Control burn when new growth is 1/2 to 1 inch tall.

Little bluestem does not respond profitably to fertilizers.

F. SEED PRODUCTION: Seed production is difficult.

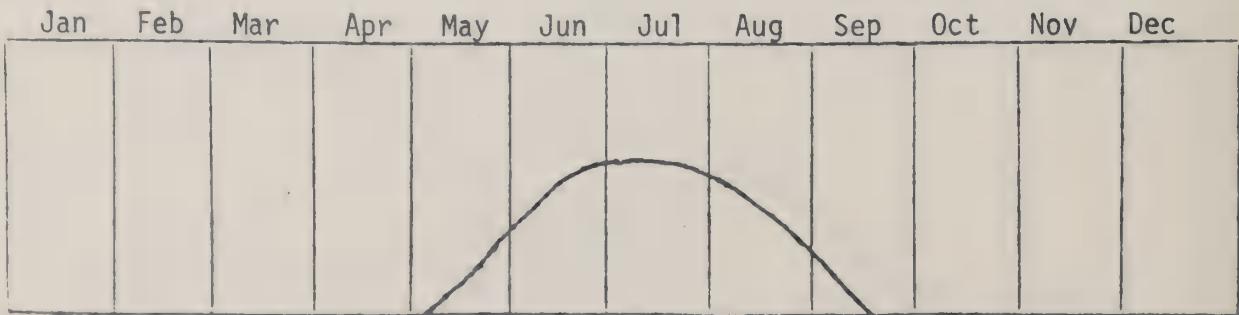
G. STRONG POINTS: Little bluestem is more drought resistant than big bluestem, indian or switchgrass. Withstands prolonged dry periods.

Very desirable for game habitat, nesting, and holding area.

H. WEAK POINTS: Under some conditions little bluestem is low in palatability.

Seed source is sometimes a problem to find.

AVERAGE GROWTH CURVE



SWITCHGRASS - Panicum virgatum

- A. GENERAL PLANT DESCRIPTION: Switchgrass is a native, perennial, warm-season sod-forming tall grass with vigorous roots, which reproduces from underground stems and seed. Switchgrass has rather large seed with sprangled-type seed head, on stalks 3 to 6 feet tall.
- B. VARIETIES: Cave-in-Rock - Blackwell
- C. SITE: Adapted to wide range of soils with best growth on fertile moist soil. However, it will produce good growth on droughty infertile, eroded soils.
- D. ESTABLISHMENT:
 - 1. Seeding date: April 15 - June 1
 - 2. Seeding rate: 5-8 pounds Pure Live Seed per acre
(7 kg/PLS/ha)
 - 3. Seeding depth: 1/8 - 1/4 inch.
 - 4. Inoculant: None
 - 5. Soil fertility: Use soil test to determine lime and fertilizer needs.
 - 6. Seedbed preparation: A firm, well prepared seedbed is necessary.
 - 7. Method of seeding: A specialized grassland seeder is best. But it can be seeded with a conventional grain drill using the legume seedbox and then roll to pack the soil very firm, or a fertilizer spreader, watch for separation of seed and carrier such as fertilizer. Remove tension from drill furrow openers to prevent deep seed placement.

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Switchgrass - 2

E. MANAGEMENT: Do not graze during the year established.

Chemical control for weeds may be necessary during the first growing season. CAUTION - Follow directions on container label.

Fertilize with 40 pounds of nitrogen about the middle of May, and 40 pounds of nitrogen after the first grazing.

Graze when 15 - 20 inches tall. When eaten down to 8 inches, move animals to another pasture.

Graze between June 1 and September 1.

To improve vigor of grass stand defer grazing to August 1.

Preferred by livestock early in the growing season. Preference drops as seedheads and roots develop, when seeded in mixture of big bluestem, little bluestem and indiangrass.

Control burn when spring growth is 1/2 to 1 inch in height, approximately every third year.

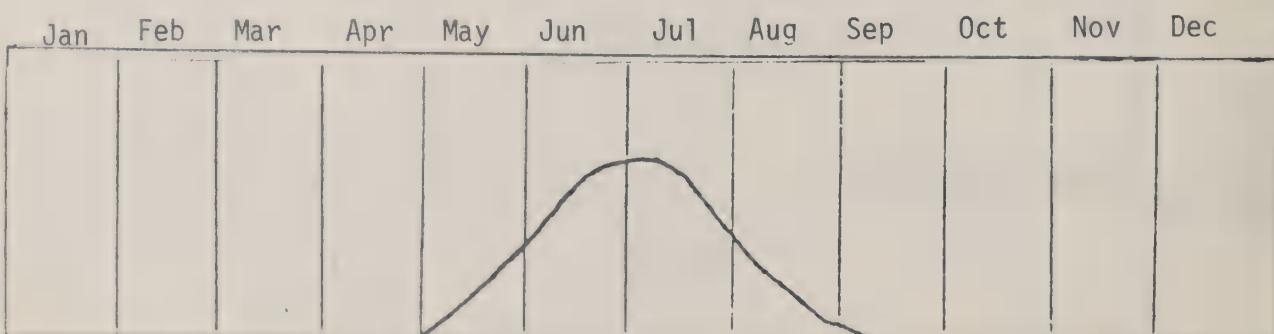
F. SEED PRODUCTION: Plant in rows for best seed production. Some years there are very small amounts of viable seed produced.

G. STRONG POINTS: Easier to seed and get a stand than other warm season native grasses.

H. WEAK POINTS: The stand will decrease when continually grazed closer than 8 inches during the growing season.

Switchgrass value for standing winter feed is poor.

AVERAGE GROWTH CURVE



WEEPING LOVEGRASS - Eragrostis curvula

- A. GENERAL PLANT DESCRIPTION: Weeping lovegrass is a warm-season perennial bunch grass which grows to a height of 2 to 4 feet. The leaves are long and narrow. These long drooping leaves suggest its common name. A single plant may form a dense sod 8 inches in diameter.
- B. VARIETIES: Morpa - Only variety recommended for this area.
- C. SITE: Adapted to any type of well-drained soil, but prefers the sandy loams.
- D. ESTABLISHMENT:
 - 1. Seeding date: April 20 to June 15
 - 2. Seeding rate: 3 pounds Pure Live Seed per acre
(3 kg/PLS/ha)
 - 3. Seeding depth: 1/8 to 1/4 inch
 - 4. Inoculant: None.
 - 5. Soil fertility: Use soil test. In absence of soil test a starter fertilizer of 20-60-40 may be used.
 - 6. Seedbed preparation: A firm, well-prepared seedbed is desirable.
 - 7. Method of seeding: Mixing lovegrass seed with fertilizer and using fertilizer box on grain drill with spring tension removed and letting drag chains cover has been used. Rolling after seeding is very desirable. Specialized grassland seeder is the best method for seeding weeping lovegrass.

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Weeping Lovegrass - 2

E. MANAGEMENT: Intensive grazing should be used when plants are 12 to 18 inches high. Lovegrass should be fenced separate from other grasses.

Graze down to a 4 inch level and remove cattle, thus allowing for regrowth.

Weedy grasses and broadleaf weeds can be controlled in young weeping lovegrass by using a large number of animals per acre in a period of 3 to 4 days.

Top dressing with 30 pounds of nitrogen per acre about May 15 increases production and palatability into the summer months.

Prescribed burn or mow in early spring to remove old residue.

Do not graze after September 15 until hard freeze (about November 1).

F. SEED PRODUCTION: Yields are unpredictable and irregular.

G. STRONG POINTS: Good production on droughty soils with very little moisture.

Excess growth can be stock-piled and grazed in the winter, even though it is dry.

Cost of seed is lower, and more readily accessible than many of the other warm season grasses.

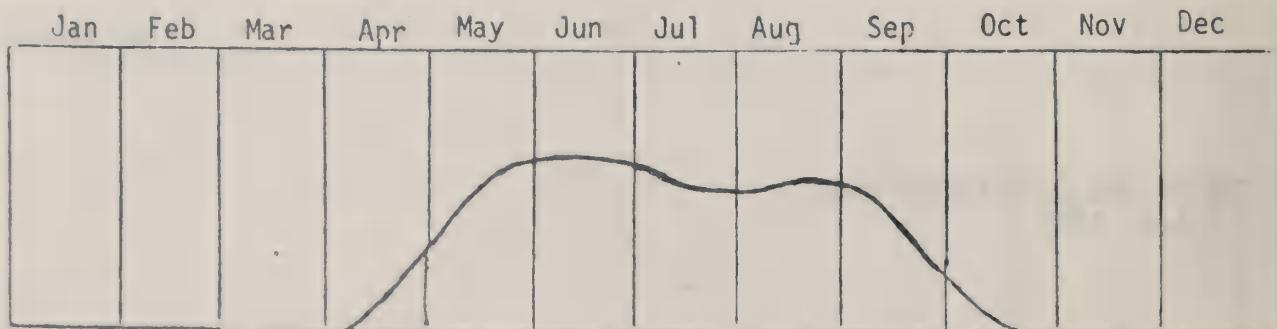
Has shorter establishment period than other warm season grasses.

Shade tolerant.

H. WEAK POINTS: Low palatability during real dry period. (After a rain the plant will tender-up in 24 to 36 hour period.)

During establishment, or in excessively thick stands, grazing animals will pull young plants during wet periods.

AVERAGE GROWTH CURVE



ALFALFA - *Medicago sativa*

- A. GENERAL PLANT DESCRIPTION: A deep-rooted perennial legume. Outstanding for hay, pasture, and soil improvement. The most nutritious and palatable forage. Alfalfa is high in protein and produces a quantity of forage.

There are 5 types of alfalfa grown in the United States. The strain, Common, is the type most widely used. The spreading or creeping type is being tested for pasture use by several experiment stations. Because it spreads by rhizomes, it may have possibilities with grass mixture.

- B. VARIETIES: Weevlcheck, Vernal, Buffalo, Ranger, Cody.
- C. SITE: Best adapted to a deep, well-drained loam soil. However it does very satisfactorily on excessively well-drained soils in the area.
- D. ESTABLISHMENT:
1. Seeding date: August 15 to September 20.
April 15 to May 10.
 2. Seeding rate: 12 - 15 pounds Pure Live Seed per acre
(15 kg/PLS/ha)
 3. Seeding depth: 1/4 to 1/2 inch
 4. Inoculant: Inoculate with proper rhizobium. Inoculated seed should be planted within 12 hours. Avoid exposing inoculated seed to direct sunlight.
 5. Soil fertility: Lime and fertilize according to soil test. Lime needs to be applied a minimum of 6 months prior to seeding for best results.
 6. Seedbed preparation: A well prepared, clean, firm seedbed is a must.
 7. Method of seeding: Drilling and broadcasting are the most common methods used. Roll with cultipacker before and after seeding. Specialized seeder that has depth bands and packer wheels is the most desirable.

Alfalfa - 2

E. MANAGEMENT: Maturity of the plant is an important factor.

Separate large field into small fields that can be grazed off in 3 - 5 days

Use maximum number of livestock - "eat off and get off".

Graze fields approximately every 28 to 30 days.

You may want to alternate grazing and cutting hay.

Cut for hay when 1/10 bloom or when new shoots begin to emerge from the crown.

Fertilize after the first grazing period or hay crop.

After the 15th of September, do not graze until hard freeze.

Weevil control is a must for alfalfa growth and maintenance.

F. SEED PRODUCTION: Most seed is produced in a less humid area.

G. STRONG POINTS: High in protein quality and quantity.

Excellent response to irrigation.

High yields for pasture or hay.

Long life legume.

Does well on droughty soils.

Some types spread by rhizomes.

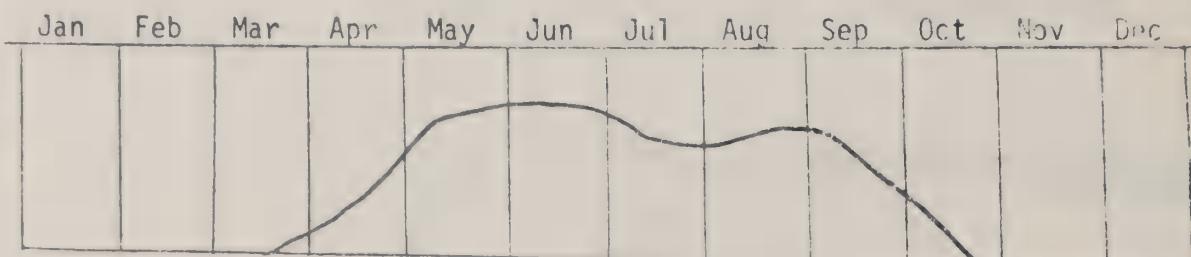
H. WEAK POINTS: Insects are a problem.

May cause bloat.

Does not tolerate wet soils.

Requires high level of management.

AVERAGE GROWTH CURVE



ALSIKE CLOVER - Trifolium hybridum

- A. GENERAL PLANT DESCRIPTION: Alsike is an upright short-lived perennial legume. Usually treated agriculturally as a biennial.
- B. VARIETIES: Aurora
- C. SITE: Heavy soil abundantly supplied with moisture.
- D. ESTABLISHMENT:
 1. Seeding date: January 15 - March 15
 2. Seeding rate: 4-6 pounds Pure Live Seed per acre
(5 kg/PLS/ha)
2 pounds Pure Live Seed in grass mixture
 3. Seeding depth: 1/4 inch or less
 4. Inoculant: The correct inoculant must be used. Inoculated seed should not be exposed to sunlight and should be planted within 12 hours.
 5. Soil fertility: Tolerant of acid soil conditions but will respond to lime, phosphate, and potash. Does well on soils that are too acid for red clover.
 6. Seedbed preparation: Usually broadcast or drilled into weakened stand of grass.
 7. Method of seeding: Broadcasting in late winter or early spring on top of a weakened grass sod is a common method.

Alsike Clover - 2

E. MANAGEMENT: Alsike clover is a good companion for perennial grasses on wet soils.

Do not graze 30 days prior to the first frost to allow build-up of food reserves in roots.

Need to let the plant produce seed every two years.

F. SEED PRODUCTION: Special management is required where seed crop is grown.

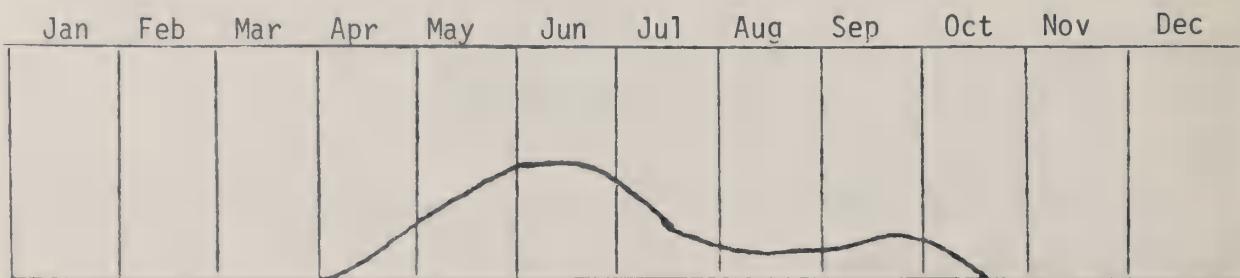
G. STRONG POINTS: It seldom winter kills.

Considered resistant to both northern and southern anthracnose.

Good legume with grasses that grow on cold wet soils.

H. WEAK POINTS: Generally lacks persistence, living only about 2 - 3 years.

AVERAGE GROWTH CURVE



BIRDSFOOT TREFOIL - Lotus corniculatus

- A. GENERAL PLANT DESCRIPTION: Birdsfoot trefoil is a leafy, fine stemmed, warm-season perennial legume. Its upright or spreading stems grow from a single crown. The main stems may attain a height of 18 - 24 inches.
- B. VARIETIES: Dawn
- C. SITE: It will grow on poorly drained, droughty, infertile, acid soils. Although it tolerates rather adverse soil conditions, it is most productive on fertile, well-drained soils.
- D. ESTABLISHMENT:
 - 1. Seeding date: February 1 - March 20 (Spring seeding)
August 15 - September 15 (Fall seeding)
 - 2. Seeding rate: 5-8 pounds Pure Live Seed per acre
(7 kg/PLS/ha)
 - 3. Seeding depth: 1/4 inch or less.
 - 4. Inoculant: A special strain of Rhizobium bacteria is required for effective inoculation of trefoil. Plant inoculated seed within 12 hours.
 - 5. Soil fertility: Soil test should be used to determine plant food needs. The pH level should be in the 5.5 to 6.0 range.
 - 6. Seedbed preparation: Lime should be applied and worked into the soil prior to seeding. Trefoil responds well to phosphate. It may be established in rough or finely prepared soils, however, it is essential that the immediate seedbed be very firm.
 - 7. Method of seeding: More satisfactory results are usually obtained with a drill or brillion seeder than by broadcasting and packing the soil.

Birdsfoot Trefoil - 2

E. MANAGEMENT: Trefoil or trefoil-grass mixtures should be top dressed each year with a 0-30-60 fertilizer to maintain production.

A herbicide may be necessary to control competition the first growing season. CAUTION - Follow explicit label recommendations on herbicide container.

Avoid grazing between September 15 and middle of October.

Fescue is the poorest choice of all the grasses to grow with trefoil.

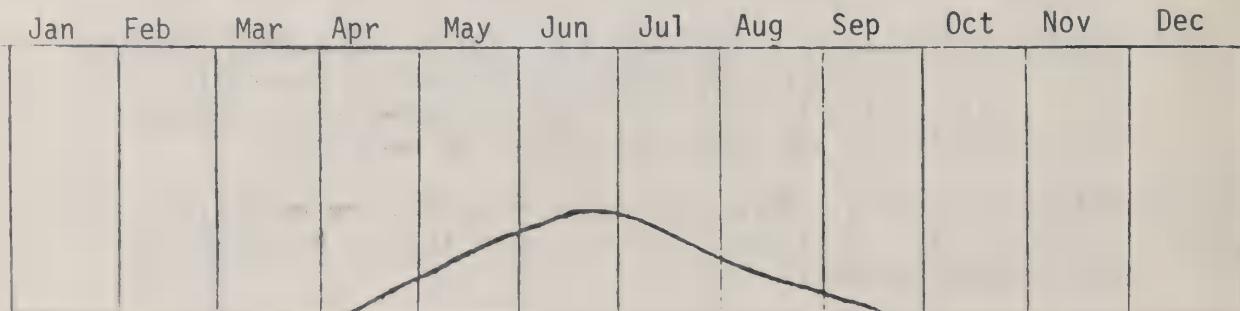
F. SEED PRODUCTION: It produces an abundance of seed but the seed is difficult to harvest. The most common method is the windrow-combine method.

G. STRONG POINTS: Trefoil does not cause bloat.

High quality legume.

H. WEAK POINTS: During the seedling period it is less aggressive than most plants. Competition from other plants must be controlled.

AVERAGE GROWTH CURVE



CRIMSON CLOVER - Trifolium incarnatum

A. GENERAL PLANT DESCRIPTION: Crimson clover is an upright annual, cool season, deep rooted legume. It has numerous hairy stems branching from the crown. The plant grows to a height of 1 to 3 feet.

B. VARIETIES: Dixie - Talladega - Tibbee - Chief - Kentucky.

C. SITE: Crimson clover is tolerant of medium soil acidity and will thrive on both sandy and clay soils. It does not tolerate soils with poor drainage.

D. ESTABLISHMENT:

1. Seeding date: August 20 - September 20

2. Seeding rate: 10-15 pounds of hulled Pure Live Seed per acre
(12 kg/PLS/ha) pure stand.

10 pounds per acre (10 kg/PLS/ha) with grass mixture.

3. Seeding depth: 1/4 inch or less

4. Inoculant: Seed should be inoculated with the proper inoculant. Inoculated seed should not be exposed to sunlight and should be planted within 12 hours.

5. Soil fertility: Soil test should be used to determine lime and fertilizer needs. Crimson clover is a heavy user of phosphate.

6. Seedbed preparation: Seeding immediately after a rain increases the chances of a stand.

7. Method of seeding: Broadcasting or drilling into a weakened stand of grass sod is the most common method.

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Crimson Clover - 2

E. MANAGEMENT: Crimson clover fits well in association with a perennial grass.

Manage to insure reseeding each year.

A good stand will yield approximately 2 tons per acre.

F. SEED PRODUCTION: Ranges from 1000 to 1200 pounds of seed per acre. Average harvested yield is 250 to 300 pounds because it shatters very readily.

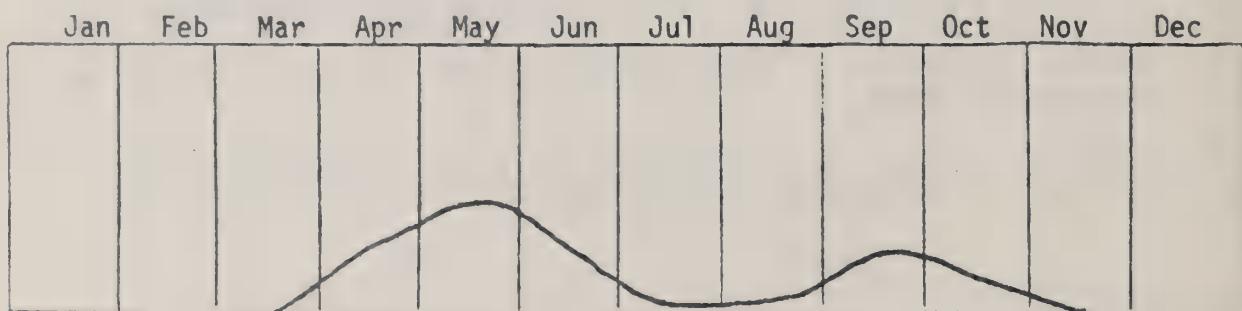
G. STRONG POINTS: Makes more growth at lower temperatures than most other clover species.

Early source for honey production.

H. WEAK POINTS: Crimson clover is attacked by several diseases.

Flowers are not self-pollinating and need bees or other insects to bring about pollination.

AVERAGE GROWTH CURVE



CROWNVETCH - Coronilla varia

- A. GENERAL PLANT DESCRIPTION: Crownvetch is a long-lived, deep-rooted, perennial legume which grows to a height of 3 to 4 feet. It reproduces by seed and spreads vegetatively by fleshy rhizomes.
- B. VARIETIES: Emerald - Penngift - Chemung
- C. SITE: Very well drained soils of pH 5.5 or above.
- D. ESTABLISHMENT:
 - 1. Seeding date: March 15 to May 15
December 15 to March 15.
 - 2. Seeding rate: 5-10 pounds Pure Live Seed per acre (8 kg/PLS/ha)
3 pounds for mixture of grass legume if drilled
in 30 - 40 inch rows.
 - 3. Seeding depth: 1/8 to 1/4 inch.
 - 4. Inoculant: Use Crownvetch inoculant only. Use an adherent such
as canned milk or sugar water. Inoculated seed should not be
exposed to direct sunlight. Plant inoculated seed within 8 hours.
 - 5. Soil fertility: Lime to soil test of 6.0 pH or above. Basic
treatment at seeding should be 40 pounds of phosphate and 80
pounds potash.
 - 6. Seedbed preparation: A well prepared firm seedbed, preferably
plowed in fall to control weeds. Chemical for weed control may
be needed. Check with extension service for recommendations.
 - 7. Method of seeding: Brillion seeder.
 - Cyclone seeder and roll
 - Grain drill and let chains cover, then roll.Mulching will increase chances of getting a better stand.

Crownvetch - 2

E. MANAGEMENT: Seedlings should be well established before grazing.

Do not graze below 4 inches in height.

Chemical weed control may be necessary during establishment.

CAUTION - Follow recommendations for application on container label.

Rest when root reserves are being stored which is usually September 15 to October 20th.

F. SEED PRODUCTION: Very difficult to harvest because crownvetch is an indeterminate seed producer. Request technical assistance for seed harvest.

G. STRONG POINTS: Non-bloating legume.

Source of Nitrogen for associated grasses.

Perennial legume.

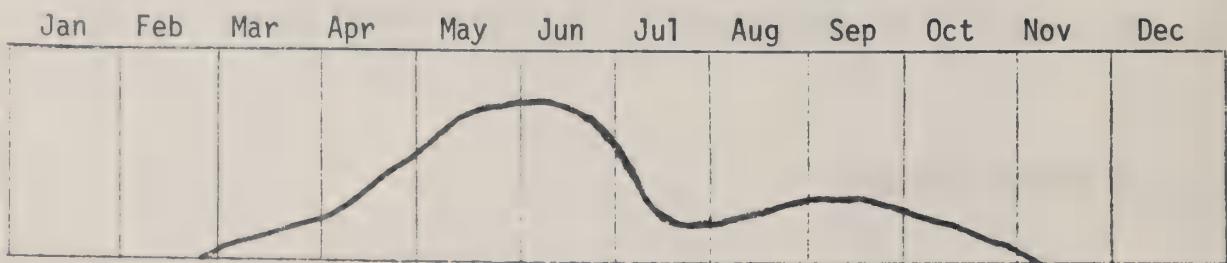
Very drought tolerant.

H. WEAK POINTS: Slow in germination and seedling growth.

Does not tolerate wet soil or shade.

May cause digestive problem in non-ruminant animals.

AVERAGE GROWTH CURVE



RED CLOVER - Trifolium pratense

- A. GENERAL PLANT DESCRIPTION: Red clover is a biennial, or short-lived perennial, upright leafy legume which grows to a height of 15 - 30 inches. It has numerous thick hairy stems arising from a crown. Its large velvety leaves are softly hairy beneath and marked above with a characteristic lightcolored spot.
- B. VARIETIES: Kenland - Kenstar - Redman - Redland
- C. SITE: Prefers fertile, well-drained, medium to heavy textured soil.
- D. ESTABLISHMENT:
 1. Seeding date: January 15 - March 15
 2. Seeding rate: 8 pounds Pure Live Seed per acre (8 kg/PLS/ha)
pure stand.
4 pounds Pure Live Seed per acre (4 kg/PLS/ha)
with grass mixture.
 3. Seeding depth: 1/4 inch or less.
 4. Inoculant: Use proper inoculant for red clover. Inoculated seed should not be exposed to sunlight and should be planted within 12 hours.
 5. Soil fertility: Medium to high fertility level, with pH of 5.5 or higher.
 6. Seedbed preparation: Well prepared firm seedbed or on surface of thin stand of grass sod.
 7. Method of seeding: Drilled or broadcast on grass sod in January or February to let freezing and thawing work seed into the soil.

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Red Clover - 2

E. MANAGEMENT: Top dress annually with a 0-30-60 fertilizer.

Rest pastures from September 15 to frost so root reserves can be stored.

Should be allowed to produce seed each year in order to permit reseeding.

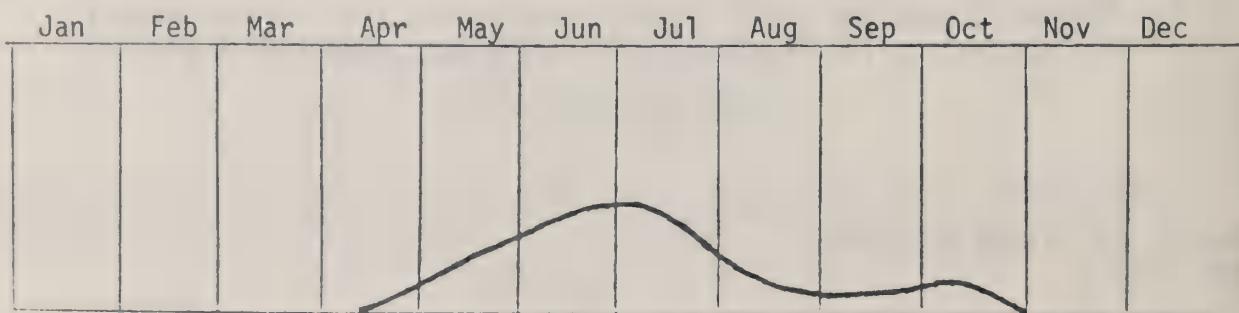
F. SEED PRODUCTION: Must be pollinated by insects for producing seed. Provide one hive of honey bees per 2 acres of red clover. Seed crops are generally harvested the second year from the second crop.

G. STRONG POINTS: Red clover is best grown with a grass and is a good source of nitrogen for associated grass. Its high magnesium content aids in prevention of grass tetany.

H. WEAK POINTS: Can cause bloating.

Insects are extremely troublesome to red clover.

AVERAGE GROWTH CURVE



SERICEA LESPEDEZA - Lespedeza cuneata

- A. GENERAL PLANT DESCRIPTION: Sericea is an upright, perennial summer legume. It grows to a height of 3 to 4 feet.
- B. VARIETIES: Serala - Arlington - Interstate
- C. SITE: Sericea grows well on many kinds of soil but does best on the deep well-drained silt soils.
- D. ESTABLISHMENT:
 - 1. Seeding date: February 15 - April 15
 - 2. Seeding rate: 30 to 45 pounds of Pure Live Seed (hulled, scarified) per acre (35 kg/PLS/ha).
 - 3. Seeding depth: 0 to 1/8 inch.
 - 4. Inoculant: Through most of the region of adaptation, sericea seed does not require inoculation. Inoculate seed to be sure.
 - 5. Soil fertility: Lime and fertilize according to soil test.
 - 6. Seedbed preparation: A good seedbed is needed to get a stand of sericea.
 - 7. Method of seeding: Shallow plow or disc soil and use a harrow or cultipacker to firm the seedbed and provide loose soil on top.
Broadcast seed.
It is not necessary to cover the seed.

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Sericea Lespedeza - 2

E. MANAGEMENT: Sericea should not be cut or grazed during the establishment year.

Grazing should start when the plants are about 6 inches tall. Livestock should be removed when the plants are grazed down to about 3 inches. Pastures understocked tend to be spot grazed. To keep grazing uniform, the pasture should be mowed.

Sericea should be fertilized annually or at least every other year with a 0-60-60 fertilizer.

Cut for hay when the plants are 12 to 15 inches tall.

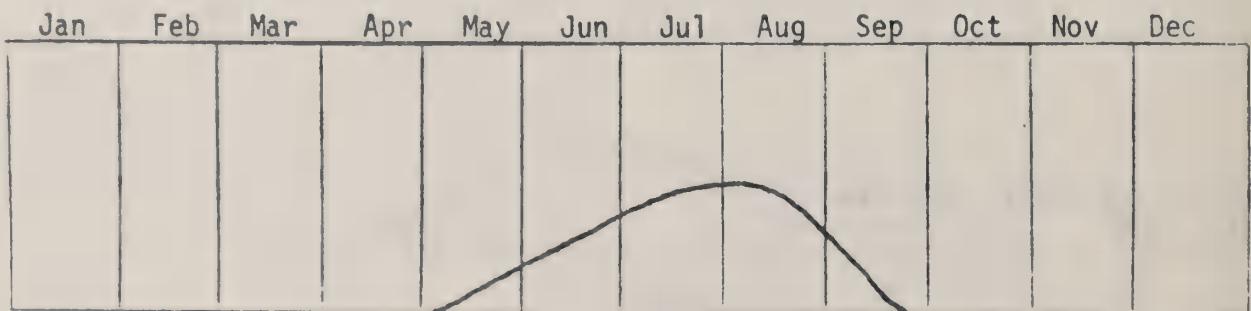
F. SEED PRODUCTION: Most of the seed crop is harvested by direct combining. Begin seed harvest when 65 to 75 percent of the seed hulls are brown and hulled seeds are firm.

G. STRONG POINTS: Very few insects feed on sericea and it is remarkably free of diseases.

H. WEAK POINTS: High tannin content in mature plants.

Not palatable when plant is more than 15 inches tall.

AVERAGE GROWTH CURVE



WHITE CLOVER - Trifolium repens

- A. GENERAL PLANT DESCRIPTION: Ladino is a shallow-rooted perennial legume. Its solid, creeping stems grow to 15 inches long. It roots at the joints or nodes where they touch the soil.
- B. VARIETIES: Ladino
- C. SITE: Best adapted to a well drained silt loam or clay soils with 6-7 pH.
- D. ESTABLISHMENT:
 - 1. Seeding date: February 1 to April 1
 - 2. Seeding rate: 1/2 to 2 pounds Pure Live Seed per acre (.6 kg/PLS/ha)
 - 3. Seeding depth: 1/4 inch or less.
 - 4. Inoculant: Seed should be inoculated with the proper rhizobium. Inoculated seed should not be exposed to sunlight and planted within 12 hours.
 - 5. Soil fertility: Liming to achieve a minimum soil pH of 6 is recommended.
 - 6. Seedbed preparation: Usually broadcast on top of the ground on a weakened stand of grass.
 - 7. Method of seeding: Broadcasting in late winter or early spring on top of sod is the most widely used method.

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White Clover - 2

E. MANAGEMENT: Do not allow overgrowth of grass in a grass - white clover pasture.

Rotate pastures and give a rest period.

Management in the fall should allow good regrowth of clover and thus rooting of new stolons.

F. SEED PRODUCTION: Pastures where a seed crop is harvested requires special management during the year of seed harvest.

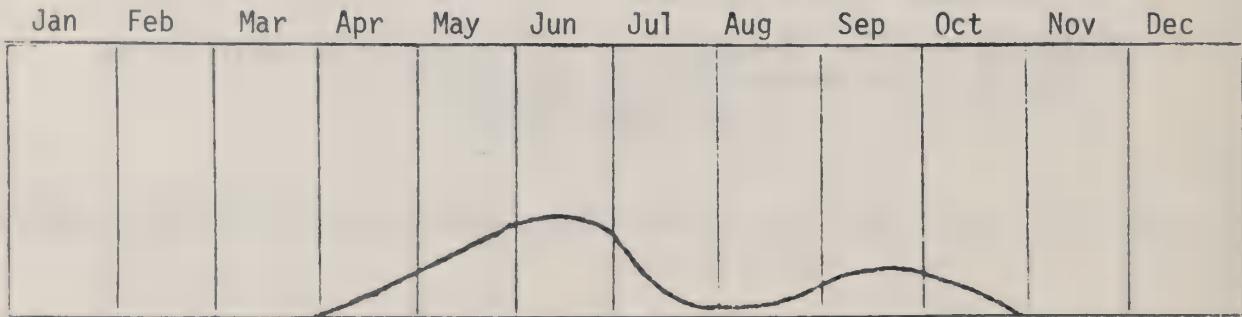
Average about 150 pounds per acre. Bees are necessary for pollination.

G. STRONG POINTS: It is considered to be competitive when moisture and fertility are adequate. It should be sown with vigorous growing grasses, such as fescue.

H. WEAK POINTS: Ladino requires a soil well supplied with phosphorus. Production drops quickly in hot dry weather.

Ladino can cause bloating of cattle.

AVERAGE GROWTH CURVE



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